

MATH 1550 HW6 Fall 2018

1

Section 4.2 #16 |  $n=6, p=0.39 \rightarrow q=1-p=0.61 \Rightarrow P(x) = \frac{6!}{(6-x)!x!} (0.39)^x (0.61)^{6-x}$

a)  $P(x=2) = \frac{6!}{4!2!} (0.39)^2 (0.61)^4 \approx 0.31589$

b)  $P(x \text{ at least } 4) = P(x \geq 4) = P(x=4) + P(x=5) + P(x=6)$   
 $= \frac{6!}{2!4!} (0.39)^4 (0.61)^2 + \frac{6!}{1!5!} (0.39)^5 (0.61)^1 + \frac{6!}{0!6!} (0.39)^6 (0.61)^0$   
 $\approx 0.16566$

c)  $P(x < 3) = P(x=0) + P(x=1) + P(x=2)$   
 $= \frac{6!}{6!0!} (0.39)^0 (0.61)^6 + \frac{6!}{5!1!} (0.39)^1 (0.61)^5 + \frac{6!}{4!2!} (0.39)^2 (0.61)^4$   
 $\approx 0.56504$

#27 |  $n=7, p=0.59 \rightarrow q=0.41$

a)  $\mu = np = 7(0.59) \approx 4.13$

b)  $\sigma^2 = npq = 7(0.59)(0.41) \approx 1.6933$

c)  $\sigma = \sqrt{npq} \approx 1.3012$

Section 4.3

#11 | geometric  $\leadsto p=0.19, q=0.81 \Rightarrow P(x) = (0.19)(0.81)^{x-1}$

Soln: a)  $P(x=1) = (0.19)(0.81)^0 = 0.19$

b)  $P(x=1) + P(x=2) + P(x=3) = (0.19)(0.81)^0 + (0.19)(0.81)^1 + (0.19)(0.81)^2$   
 $\approx 0.4685$

$P(\text{1st sale on 1st, 2nd, or 3rd})$

c)  $P(\text{do not make sale on 1st 3}) = 1 - P(\text{1st sale on 1st, 2nd, 3rd})$   
 $= 1 - 0.4685$   
 $= 0.5315$

#13 | poisson  $\leadsto \mu=8 \Rightarrow P(x) = \frac{8^x \cdot e^{-8}}{x!}$

Soln:

a)  $P(x=5) = \frac{8^5 e^{-8}}{5!} \approx 0.0916$

b)  $P(x \geq 5) = 1 - P(x < 5)$   
 $= 1 - (P(x=1) + P(x=2) + P(x=3) + P(x=4))$   
 $= 1 - \left( \frac{8^1 e^{-8}}{1!} + \frac{8^2 e^{-8}}{2!} + \frac{8^3 e^{-8}}{3!} + \frac{8^4 e^{-8}}{4!} \right)$   
 $= 0.900703$

c)  $P(x > 5) = 1 - P(x \leq 5)$   
 $= \underbrace{1 - P(x < 5)}_{\text{last part}} - \underbrace{P(x=5)}_{\text{part (a)}}$   
 $= 0.900703 - 0.0916$   
 $= 0.809103$